



Microwave Ovens



Heating up leftovers, popping popcorn for a movie, and making a steaming cup of hot chocolate are all made easy by using a microwave oven. Not only does food cook fast, but cooking with microwave ovens can be more energy efficient than conventional cooking because the energy heats only the food, not the whole oven compartment. Microwave ovens are electrically operated ovens using high-frequency electromagnetic waves that penetrate food, causing its molecules to vibrate and generate heat within the food to cook it very quickly.

Microwaves are a form of electromagnetic radiation; that is, they are waves of electrical and magnetic energy moving together through space. Electromagnetic radiation ranges from the energetic x-rays to the less energetic radio-frequency waves (or RF waves) used in broadcasting. Microwaves fall into the RF band of electromagnetic radiation. They have three characteristics that allow them to be used in cooking:

- They are reflected by metal
- They pass through glass, paper, plastic, and similar materials, and
- They are absorbed by foods.

Microwaves are produced inside the oven by an electron tube called a magnetron. The microwaves are reflected within the metal interior of the oven where they are absorbed by food. Microwaves cause water molecules in food to vibrate, producing heat that cooks the food. The microwave energy is changed to heat as it is absorbed by food. This does not make food radioactive or contaminated.



The microwaves do not make food radioactive.

The Food and Drug Administration's (FDA) Center for Devices and Radiological Health (CDRH) says that a person can be exposed to radiation if a microwave oven doesn't totally seal. Research is being done on the potential health effects from microwave exposure. It is known that microwave radiation can heat body tissue the same way it heats food. The type of heat injuries from microwave radiation can only be caused by exposure to large amounts of microwave radiation, much more than you would get from a household microwave.

Microwave radiation leakage is difficult to detect because you can't smell or see it. Old or faulty door seals are the most common causes of microwave radiation leakage. Routinely slamming the door, a build-up of dirt, or simple wear and tear of continued use can cause door seals to be less effective. Due to door leakage, it is advised by the FDA to not stand directly in front or up against the oven while it is operating.

Who is protecting you

U.S. Food and Drug Administration (FDA)

FDA's Center for Devices and Radiological Health (CDRH) sets and enforces standards of performance for electronic products to assure that radiation emissions do not pose a hazard to public health. These standards can be viewed on the FDA's Code of Federal Regulations on Microwave Ovens.

The FDA establishes performance standards for microwave ovens. All microwave ovens must have a label stating that they meet these performance standards. In addition, the FDA requires that all ovens have a label explaining precautions for use. To make sure the standard is met, the FDA tests microwave ovens at commercial establishments, locations of dealers and distributors, manufacturing plants, and its own laboratories. Evaluations of manufacturers' radiation testing and quality control programs are also inspected by the FDA.

What you can do to protect yourself

The best way to protect yourself from microwave oven radiation is to comply with the following safety tips:

- Follow the manufacturer's instruction manual for recommended operating procedures and safety precautions for your oven model.
- Don't operate an oven if the door does not close firmly or is bent, warped, or otherwise damaged.
- Never operate an oven if you have reason to believe it will continue to operate with the door open.
- As an added safety precaution, don't stand directly against an oven (and don't allow children to do this) for long periods of time while it is operating.
- Users should not heat water or liquids in the microwave oven for excessive amounts of time.

Resources

You can explore this radiation source further through the resources at the following URL:
<http://www.epa.gov/radtown/microwave.html#resources>

We provide these resources on-line rather than here so we can keep the links up-to-date.